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ANNUAL REPORT OF THE CHIEF OF ENGINEERS, 1913

TABLE NO. 8 OF APPENDIX JJJ

RESULTS OF DISCHARGE OBSERVATIONS MISSISSIPPI RIVER AND TRIBUTARIES

FOR

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TABLE No. 8.—*Results of discharge observations, Mississippi River.*

AT COLUMBUS, KY. (21.6 MILES BELOW CAIRO).

Date.	Gauges.			Cross section of discharge.						Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
				Area.		Depth.												
	Standard gauge.	Local.	Change in 24 hours.	Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.									
1913.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Feet.*	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*				
Jan. 21	43.2	43.2	+0.6	191,669	210,683	61.5	67.6	86.0	3,115	.....	7.47	1,431,207	127,218	1,558,425	M	11	77	III light.
22	43.8	43.8	+ .6	181,050	198,195	58.1	63.6	82.7	3,115	—12,488	8.14	1,473,676	131,178	1,604,854	M	21	81	III brisk.
23	44.2	44.4	+ .4	187,068	202,344	60.1	64.8	89.3	3,115	+ 4,149	8.18	1,530,036	135,138	1,665,174	2M	19	42	V light.
24	44.6	44.8	+ .4	190,245	204,275	61.1	65.5	95.0	3,115	+ 1,931	8.25	1,570,338	130,147	1,700,485	M	21	55	X brisk.
25 (a. m.)	44.8	44.9	+ .2	187,684	201,403	60.2	64.5	89.0	3,115	— 2,872	7.68	1,440,775	124,445	1,565,220	F	12	59	V light.
25 (p. m.)	.....	44.9	.....	[1] 187,684	.....	.....	.....	.....	3,115	.....	7.76	1,456,552	124,445	1,580,997	2M	19	.....	Do.
26	45.0	45.0	+ .2	[2] 187,995	.....	.....	.....	.....	3,115	.....	7.78	1,463,190	124,445	1,587,635	2M	18	.....	V strong.
28	45.0	45.0	.0	190,981	204,388	61.3	65.5	86.0	3,115	+ 2,985	7.49	1,431,069	124,445	1,555,514	M	19	53	X brisk.
29	45.0	44.9	.0	187,233	200,952	60.1	64.5	92.0	3,115	— 3,436	7.63	1,428,810	121,031	1,549,841	2M	19	73	V strong.
30	44.9	44.9	— .1	189,616	203,335	60.9	65.2	98.0	3,115	+ 2,383	7.45	1,412,936	121,031	1,533,967	M	18	79	IV strong.
31	44.8	44.8	— .1	193,473	207,503	62.1	66.6	95.0	3,115	+ 4,168	7.51	1,453,762	117,617	1,571,379	2M	19	73	IX strong.
Feb. 1	44.8	44.8	.0	[1] 193,473	.....	.....	.....	.....	3,115	.....	7.44	1,440,151	117,617	1,557,768	2M	18	.....	XI strong.
2	44.6	44.6	— .2	190,065	204,718	61.0	65.7	96.0	3,115	— 2,785	7.18	1,364,166	110,789	1,474,955	2M	18	71	IV strong.
3	44.5	44.5	— .1	189,662	204,627	60.9	65.7	90.0	3,115	— 91	7.09	1,344,726	107,375	1,452,101	2M	18	74	XI strong.
Apr. 5	49.0	49.2	.0	200,423	200,735	64.3	64.4	92.0	3,118	— 3,892	7.96	1,595,176	323,324	1,918,500	2M	16	63	Very light.
6	49.2	49.2	+ .2	[1] 200,423	.....	.....	.....	.....	3,118	.....	7.91	1,586,169	322,575	1,908,744	2M	18	.....	
7	49.2	49.3	.0	200,595	200,595	64.3	64.3	90.0	3,118	— 140	8.10	1,624,845	328,416	1,953,261	2M	14	67	
8	49.3	49.3	+ .1	203,026	203,026	65.1	65.1	93.1	3,118	+ 2,431	8.22	1,668,286	328,548	1,996,834	2M	17	65	III light.
9	49.3	49.3	.0	204,353	204,353	65.5	65.5	93.0	3,118	+ 1,327	8.25	1,686,232	328,617	2,014,849	M	18	65	Do.
10	49.2	49.2	— .1	207,202	207,514	66.5	66.6	94.5	3,118	+ 3,161	8.15	1,688,550	322,508	2,011,058	2M	18	65	IV light.
11	49.2	49.2	.0	201,700	202,012	64.8	64.9	92.5	3,118	— 5,502	7.86	1,584,665	322,508	1,907,173	2M	16	68	VIII brisk.
16	47.0	46.9	— .5	200,672	208,155	64.6	67.0	100.9	3,118	+ 6,143	7.65	1,534,561	187,896	1,722,457	F	15	71	IX very light.

[1] Used areas from preceding observations. [2] Area interpolated.

NOTES.—The discharge section was the same used in 1912 and previous years.

The standard gauge column gives the 8 a. m. readings of the M. R. C. gauge at Columbus, Ky. The local gauge column gives the reading on the same gauge at the time of making the discharge measurement. The elevation of the gauge zero is 266.46 feet above mean Gulf level.

Datum areas were computed below 49.3 feet on the gauge.

In the column of method M denotes meter, 2M simultaneous measurements with two meters, and F double floats. Meters were run at 6/10 depth and the lower float at middepth.

Overbank discharge was measured on the right bank, Jan. 23 and 27, and Apr. 6, overbank discharge on the left bank was measured Apr. 7, 8, and 10. All other overbank measurements were deduced from these.

Price meters Nos. 25 and 34 and Haskell meter No. 124 were used prior to Feb. 3, and Price meters Nos. 38, 243, and 309 after that date.

Observations and reduction made under direction of Maj. Clarke S. Smith, Corps of Engineers, U. S. Army, secretary Mississippi River Commission.

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AT HELENA, ARK. (307 MILES BELOW CAIRO).

Jan. 27	45.3	45.6	+0.2	174,502	185,331	54.8	58.2	93.1	3,185								35	
28	46.0	46.0	+ .7	[1] 175,776					3,185		7.21	1,273,126	24,250	1,297,376	2M	15		VI light.
28		46.3		[1] 176,732					3,185		7.54	1,331,764	25,229	1,356,993	F	15		VII light.
30	47.2	47.2	+ .6	182,541	188,274	57.3	59.1	98.4	3,185	+2,943	7.36	1,342,820	27,159	1,369,979	2M	17	61	VI light.
31	47.7	47.8	+ .5	[1] 181,560					3,185		7.49	1,359,289	29,142	1,388,431	2M	16		X light.
Feb. 1	48.0	48.0	+ .3	179,305	182,490	56.3	57.3	97.8	3,185	—5,784	7.58	1,358,303	29,794	1,388,097	2M	17	49	XII strong.
2	48.3	48.4	+ .3	[1] 180,579					3,185		7.81	1,409,826	30,099	1,439,925	F	18		II light.
4	48.8	48.8	+ .2	186,999	187,636	58.7	58.9	100.9	3,185	+5,146	7.36	1,376,335	49,597	1,425,932	2M	17	50	Do.
5	48.8	48.9	+ .1	189,487	189,805	59.5	59.6	100.7	3,185	+2,169	7.41	1,403,685	49,923	1,453,608	2M	17	55	I light.
6	49.0	49.0	+ .1	[1] 187,747					3,185		7.32	1,374,570	50,149	1,424,719	2M	17		XII light.
6		49.0		[1] 187,747					3,185		7.76	1,457,453	50,149	1,507,602	F	18		I light.
7	49.0	49.0	.0	187,747	187,747	58.9	58.9	100.5	3,185	—2,058	7.42	1,392,484	50,149	1,442,633	2M	17	76	XII light.
9	48.8	48.8	— .1	182,047	182,684	57.2	57.4	97.8	3,185	—5,063	7.43	1,352,785	49,597	1,402,382	2M	17	81	VI light.
11	48.4	48.4	— .2	[1] 183,222					3,185		7.41	1,357,295	30,099	1,387,394	2M	17		XI brisk.
12	48.0	48.0	— .4	184,312	187,479	57.9	58.9	99.0	3,185	+4,795	7.02	1,293,115	29,794	1,322,909	2M	17	65	XII strong.

[1] Areas interpolated with corrections for changes in stage.

The discharge section is the same as used in 1912 and previous years.

The 8 a. m. readings of the United States engineer gauge at Helena, Ark., are tabulated in the standard-gauge column. The readings on the same gauge at the time of observation are tabulated in the local-gauge column. Elevation of zero of this gauge is 141.81 above mean Gulf level.

Datum areas are computed below 49.0 feet on this gauge.

In the column headed method F denotes double floats and 2M the mean of two meters. Price meters Nos. 29 and 244 were used in all cases.

Overbank discharge was measured Jan. 29 and Feb. 8. All overbank discharges were deduced from these measurements.

Observations and reduction made under direction of Maj. Clarke S. Smith, Corps of Engineers, U. S. Army, secretary Mississippi River Commission.

TABLE No. 8.—*Results of discharge observations, Mississippi River*—Continued.

AT FRIARS POINT, MISS. (318.5 MILES BELOW CAIRO).

Date.	Gauges.			Cross section of discharge.						Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
	Standard gauge.	Local.	Change in 24 hours.	Area.		Depth.												
				Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.									
1913.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Feet.*	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*				
Apr. 4	46.6																	
5	48.0	47.7	+1.4	245,567	274,327	53.8	60.1	82.9	4,564								86	
6	49.3	49.0	+1.4	[1] 252,844					4,564		5.88	1,486,415		1,486,415	2M	20		IV light.
7	50.6	49.7	+1.2	260,123	278,383	57.0	61.0	89.0	4,564	+4,056	6.00	1,559,642		1,559,642	2M	20	90	V light.
8	51.8	50.7	+1.2	261,550	276,614	57.3	60.6	89.0	4,564	−1,769	6.03	1,576,506		1,576,506	2M	20	77	III light.
10	53.4	52.1	+ .9	267,383	276,056	58.6	60.5	90.0	4,564	− 558	6.22	1,663,732		1,663,732	2M	21	67	VI very light.
11	53.6	52.6	+ .2	270,707	277,098	59.3	60.7	92.0	4,564	+1,042	6.67	1,806,957		1,806,957	F	21	73	VIII brisk.
12	53.6	52.6	.0	271,750	278,141	59.5	60.9	89.9	4,564	+1,043	6.13	1,666,662		1,666,662	2M	21	70	IX brisk.
13	53.7	52.6	+ .1	268,352	274,743	58.8	60.2	93.1	4,564	−3,398	6.27	1,682,254		1,682,254	2M	21	86	Do.
14	53.8	52.7	+ .1	275,000	280,934	60.3	61.5	92.7	4,564	+6,191	6.18	1,700,414		1,700,414	2M	21	69	X brisk.
15	53.9	52.9	+ .1	273,175	278,196	59.9	60.9	93.8	4,564	−2,738	6.70	1,830,654		1,830,654	F	21	78	X light.
16	54.0	52.9	+ .1	269,754	274,775	59.1	60.2	93.7	4,564	−3,421	6.15	1,659,468		1,659,468	2M	22	65	Calm.
17	54.2	53.0	+ .2	270,402	274,967	59.2	60.2	93.8	4,564	+ 192	6.28	1,696,876		1,696,876	2M	21	85	Do.
18	54.4	53.3	+ .2	274,068	277,264	60.0	60.7	93.9	4,566	+2,297	6.31	1,728,089	730	1,728,819	2M	21	100	Do.
19 (a. m.)	54.7	53.6	+ .3	274,810	276,636	60.2	60.6	92.9	4,566	− 628	6.36	1,747,313	[1] 1,495	1,748,808	2M	21	86	VI light.
19 (p. m.)		53.6		274,810					4,566		6.40	1,759,637	[1] 1,495	1,761,132	2M	21		VII light.
20	55.0	53.9	+ .3	272,380	272,836	59.7	59.8	93.9	4,566	−3,800	7.08	1,929,542	[1] 2,260	1,931,802	F	21	96	XII light.
21	55.1	54.0	+ .1	268,774	268,774	58.9	58.9	94.6	4,566	−4,062	6.42	1,726,300	[1] 2,515	1,728,815	2M	22	88	II very light.
22	55.2	54.0	+ .1	272,216	272,216	59.6	59.6	93.4	4,566	+3,442	6.62	1,802,036	[1] 2,515	1,804,551	2M	20	80	IV strong.
24	54.8	53.5	− .2	267,992	270,274	58.7	59.2	93.3	4,566	−1,942	6.38	1,710,897	1,495	1,712,392	2M	21	79	V light.
25	54.5	53.4	− .2	[2] 267,535					4,566		6.43	1,721,461	[1] 985	1,722,446	2M	21		X light.

[1] Interpolated.

[2] Used soundings of Apr. 24 corrected for change in stage.

The discharge section was one-half mile above Friars Point, Miss.

The readings tabulated in the standard gauge column are the 8 a. m. readings on the United States engineer gauge at Helena, Ark. The elevation of the zero of this gauge is 141.81 feet above mean Gulf level.

The readings tabulated in the local gauge column were taken at the time of observations on a gauge near the discharge section. The elevation of the zero of the local gauge is 138.13 feet above mean Gulf level.

Datum areas were computed below 54 feet on the local gauge.

Price meters 29 and 244 were used.

For note on method see page 3488.

Observations and reduction under the direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary Mississippi River Commission.

AT CHICOT CITY, ARK. (433 MILES BELOW CAIRO.)

1913.																		
Jan. 29	46.7	46.9	+0.6	224,287	261,757	49.8	57.8	71.6	4,500	.....	5.88	1,318,004	3,111	1,321,115	2M	15	56	VIII light.
30	47.3	47.5	+ .6	229,416	264,186	51.0	58.3	68.0	4,500	+ 2,429	6.00	1,375,361	4,279	1,379,640	2M	15	64	IX brisk.
31	47.8	47.8	+ .5	231,354	264,773	51.4	58.4	69.0	4,505	+ 587	6.01	1,391,126	[1] 3,728	1,394,854	F	14	79	I light.
Feb. 1	48.3	48.3	+ .5	236,561	267,728	52.5	59.1	69.9	4,505	+ 2,955	5.79	1,370,657	3,177	1,373,834	2M	14	56	III brisk.
2	48.6	48.6	+ .3	232,294	262,109	51.6	59.9	70.0	4,505	− 5,619	6.10	1,416,033	2,865	1,418,898	2M	14	77	IV brisk.
3	48.9	48.9	+ .3	234,405	262,829	52.0	58.0	68.0	4,505	+ 720	6.04	1,414,031	2,822	1,416,853	F	14	72	XI light.
4	49.2	49.2	+ .3	239,841	266,953	53.2	58.9	70.0	4,505	+ 4,124	5.97	1,431,744	4,063	1,435,807	2M	14	79	III brisk.
5	49.4	49.4	+ .2	230,252	256,463	51.1	56.6	69.0	4,505	−10,490	6.18	1,423,031	3,092	1,426,123	2M	14	94	IV light.
6	49.6	49.6	+ .2	234,684	259,994	52.1	57.4	70.0	4,505	+ 3,531	6.03	1,414,042	4,561	1,418,603	2M	14	82	V brisk.
7	49.8	49.8	+ .2	236,117	260,526	52.4	57.5	75.5	4,510	+ 532	6.21	1,466,734	5,337	1,472,071	F	15	92	III brisk.
8	49.8	49.9	.0	237,209	261,167	52.6	57.7	70.0	4,510	+ 641	6.15	1,457,996	[1] 5,598	1,463,594	2M	14	77	XI light.
11	50.0	50.0	+ .1	229,837	253,344	51.0	55.9	70.9	4,510	− 7,823	6.34	1,456,400	5,860	1,462,260	2M	14	90	III brisk.
12	50.0	50.0	.0	234,589	258,096	52.0	57.0	70.6	4,510	+ 4,752	6.21	1,456,000	9,379	1,465,379	2M	15	92	II brisk.
13	49.9	49.9	− .1	237,441	261,399	52.6	57.7	71.0	4,510	+ 3,303	6.35	1,508,355	[1] 5,598	1,513,953	2M	14	89	III brisk.
Apr. 8	49.7	50.1	+ .9	226,600	.....	.....	.....	.....	4,515	.....	6.71	1,521,212	[1] 15,400	1,536,612	2M	11	.....	VII brisk.
9	50.6	50.6	+ .9	229,292	250,091	50.8	55.2	69.7	4,515	−11,308	6.37	1,461,580	[1] 16,000	1,463,180	2M	10	41	XI brisk.
10	51.5	51.8	+ .9	227,573	242,951	50.3	53.6	70.7	4,520	− 7,140	6.42	1,460,831	[1] 17,440	1,478,271	2M	13	40	VIII brisk.
11	52.3	52.4	+ .8	239,247	251,913	52.9	55.6	72.7	4,520	+ 8,962	6.56	1,568,805	[1] 18,160	1,586,965	2M	14	59	XII light.
11	.....	52.7	.....	[1] 239,969	.....	.....	.....	72.7	4,520	.....	6.66	1,599,307	[1] 18,160	1,617,467	F	16	.....	I strong.
12	53.0	53.2	+ .7	242,048	251,098	53.6	55.4	71.7	4,520	− 815	6.73	1,629,321	19,120	1,648,441	2M	14	54	XI brisk.
13	53.6	53.6	+ .6	242,842	250,084	53.7	55.2	72.7	4,520	− 1,014	6.57	1,596,032	[1] 19,379	1,615,411	2M	14	37	Do.
14	54.0	54.0	+ .4	241,029	.....	53.3	.....	.....	4,525	.....	6.85	1,650,936	19,638	1,670,574	2M	15	.....	I brisk.
15	54.3	54.4	+ .3	239,397	243,021	52.9	53.6	73.7	4,525	−7,063	6.90	1,650,956	20,118	1,671,074	2M	14	58	I light.
16	54.5	54.5	+ .2	248,825	251,996	54.9	55.6	72.7	4,530	+8,975	6.80	1,692,242	[1] 21,386	1,713,628	2M	15	63	Calm.
17	54.6	54.6	+ .1	[1] 248,733	.....	.....	.....	.....	4,530	.....	6.43	1,599,955	[1] 22,654	1,622,609	2M	17	.....	VI light.
17	.....	54.7	.....	[1] 249,163	.....	.....	.....	.....	4,530	.....	6.68	1,664,519	[1] 23,970	1,688,489	F	14	.....	Calm.
19	54.9	55.0	+ .1	249,714	250,620	55.1	55.3	73.7	4,530	−1,376	6.62	1,653,818	[1] 25,190	1,679,008	2M	15	62	IX light.
19	.....	55.0	.....	[1] 249,726	.....	.....	.....	73.7	4,530	.....	6.64	1,658,088	[1] 25,190	1,683,278	F	15	.....	VI light.
20	55.0	55.0	+ .1	[1] 251,129	.....	.....	.....	.....	4,530	.....	6.77	1,699,756	[1] 26,195	1,725,951	2M	15	.....	II light.
22	55.1	55.1	.0	252,336	252,789	55.7	55.8	71.7	4,530	+2,169	6.64	1,676,305	[1] 27,706	1,704,011	2M	14	44	X light.
23	55.1	55.1	.0	[1] 249,145	.....	.....	.....	.....	4,530	.....	6.68	1,663,482	28,151	1,691,633	2M	13	.....	VII brisk.
24	55.1	55.2	.0	245,857	245,857	54.3	54.3	72.7	4,530	−6,932	6.77	1,663,262	[2] 28,194	1,691,456	2M	14	37	VIII light.
24	55.0	55.2	.....	[3] 245,857	.....	.....	.....	72.7	4,530	.....	7.10	1,745,177	[2] 28,194	1,773,371	F	16	.....	VI light.
25	55.1	55.2	.0	246,007	246,007	54.3	54.3	72.7	4,530	+ 150	6.96	1,713,292	[2] 28,194	1,741,486	2M	15	46	I brisk.
26	55.0	55.1	− .1	246,234	.....	.....	.....	56.6	4,530	.....	7.12	1,753,933	[2] 28,151	1,782,084	2M	15	18	III light.

[1] Interpolated. [2] Deduced from observations of Apr. 23. [3] Used preceding area.

The 8 a. m. readings on the Mississippi River Commission gauge at Arkansas City are tabulated in the standard gauge column. The elevation of the zero of the standard gauge is 96.75 feet above mean Gulf level; the elevation of the zero of the local gauge is 98.30 feet above mean Gulf level.

Datum areas were computed below 55.2 feet on the local gauge.

For note on method see page 3488.

Price meters Nos. 22 and 243 were used in the January and February observations. Price meter No. 310 and Haskell meter No. 124, wheel No. IX, were used in April. The discharge section was the same used in 1912 and earlier years.

Observations and reduction made under direction of Maj. Clarke S. Smith, Corps of Engineers, U. S. Army, secretary Mississippi River Commission.

TABLE No. 8.—*Results of discharge observations, Mississippi River*—Continued.

AT VICKSBURG, MISS. (599 MILES BELOW CAIRO).

Date.	Gauges.			Cross section of discharge.						Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
				Area.		Depth.												
	Standard gauge.	Local.	Change in 24 hours.	Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.									
1913.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Feet.*	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*				
Feb. 11	48.2	48.2	+0.4	[1] 230,405	.....	.....	.....	.....	3,490	.....	5.88	1,355,119	[2] 125,396	1,480,515	2M	16	.....	II light.
12	48.4	48.4	+ .2	230,405	244,467	66.0	68.9	122.0	3,490	.....	5.77	1,328,628	132,751	1,461,379	2M	16	106	IV light.
14	48.6	48.6	+ .1	230,987	244,351	66.2	68.8	120.0	3,490	− 116	5.94	1,372,794	[3] 161,800	1,534,594	2M	16	106	X light.
15	48.7	48.7	+ .1	236,914	249,929	67.9	70.4	120.0	3,490	+ 5,578	5.49	1,300,736	[3] 179,228	1,479,964	2M	16	86	X brisk.
16	48.8	48.7	+ .1	[3] 237,521	.....	.....	.....	.....	3,490	.....	5.29	1,255,983	183,807	1,439,790	F	14	.....	V light.
17	48.8	48.8	.0	238,124	251,139	68.2	70.7	119.0	3,490	+ 1,210	5.48	1,304,375	[3] 186,237	1,490,612	2M	18	84	IX brisk.
19	48.6	48.5	− .1	239,749	253,113	68.7	71.3	121.5	3,490	+ 1,974	5.34	1,279,647	[3] 190,767	1,470,414	2M	22	47	VII brisk.
21	48.0	48.0	− .3	235,204	250,638	67.4	70.6	120.0	3,490	− 2,475	4.88	1,147,542	183,394	1,330,936	2M	20	29	VIII strong.
Apr. 25	52.0	52.1	+ .4	259,934	260,997	73.5	73.5	124.1	3,535	+10,359	5.71	1,491,159	[3] 251,968	1,743,127	2M	13	63	II light.
27	52.4	52.4	+ .2	257,512	257,512	72.5	72.5	125.0	3,550	− 3,485	5.89	1,515,615	244,466	1,760,081	2M	16	71	VI brisk.
28	52.4	52.4	.0	[4] 257,512	.....	.....	.....	.....	3,550	.....	5.62	1,446,025	244,466	1,690,491	F	15	.....	Do.
May 1	52.2	52.3	.0	257,345	257,700	72.5	72.6	124.7	3,550	+ 188	5.87	1,509,822	[3] 271,375	1,781,197	2M	14	61	X very light.
2	52.2	52.2	.0	260,045	260,755	73.3	73.5	125.0	3,550	+ 3,055	5.82	1,513,375	269,755	1,783,130	2M	14	64	VII light.
3	52.1	52.1	− .1	259,120	260,185	73.0	73.3	122.7	3,550	− 570	5.72	1,483,037	[3] 269,881	1,752,918	2M	14	61	X light.
4	52.0	51.9	− .1	260,500	262,275	73.4	73.9	124.8	3,550	+ 2,090	5.67	1,476,862	270,009	1,746,871	2M	13	56	IX light.

[1] Used soundings of Feb. 12.
[2] Deduced from observations of Feb. 12 and 13.
[3] Interpolated.
[4] Used soundings of Apr. 27.

The gauge readings tabulated are from the United States engineer gauge at Vicksburg, Miss. Elevation of gauge zero 46.16 feet above mean Gulf level.
The 8 a. m. gauge readings are given in the standard gauge column. The local gauge readings were taken at the time of the discharge measurements.
Datum areas were computed below 52.4 feet on the gauge.
In the column of method 2M denotes simultaneous measurements with two meters and F denotes double floats. Meters were run at 6/10 depth, the lower float at mid-depth. Overbank discharge was measured on both banks and includes the Yazoo Canal. Haskell meter No. 124 and Price meters Nos. 25 and 34 were used in February, and Price meters Nos. 34, 38, and 309 were used in April and May.
The discharge section was the same one used in 1912.
Observations and reduction made under direction of Maj. Clarke S. Smith, Corps of Engineers, U. S. Army, secretary Mississippi River Commission.

AT POINT BREEZE. UPPER SECTION (755 MILES BELOW CAIRO).

1913.																		
May 1	50.0	[2] 75.1	0.0	318,134	319,739	99.1	.....	.....	3,210	.....	4.76	1,514,134	.....	.....	2M	9	.....	Calm.
3	50.2	75.2	+ .2	318,558	319,842	99.2	.....	152.5	3,210	+ 103	4.87	1,550,738	.....	.....	2M	13	73	V brisk.
6	50.4	75.5	+ .1	316,162	316,483	98.5	98.6	154.6	3,210	−2,359	4.20	1,326,340	.....	.....	F	14	61	Calm.

AT POINT BREEZE. NEW UPPER SECTION (755 MILES BELOW CAIRO).

1913.																		
May 9	50.6	[2] 75.6	0.0	232,280	232,280	83.9	83.9	135.0	2,770	.....	5.88	1,366,402	40,473	1,406,875	2M	13	59	XII light.
11	50.5	75.4	− .1	237,663	238,217	85.8	86.0	134.7	2,770	+ 5,937	5.25	1,248,582	[3] 40,447	1,289,029	F	13	46	Calm.
12	50.4	75.3	− .1	238,116	238,947	86.0	86.3	134.1	2,770	+ 730	5.66	1,347,844	40,021	1,387,865	2M	13	41	Do.
15	49.8	74.7	− .2	225,584	228,086	81.1	82.0	130.3	2,780	−10,861	4.78	1,077,874	20,410	1,098,284	2M	11	65	IX brisk.
19	48.4	73.2	− .4	229,964	236,588	83.3	85.7	129.8	2,760	+ 8,507	4.56	1,047,839	[3] 22,400	1,070,239	2M	15	51	X very light.
20	47.9	72.6	− .7	228,313	236,593	82.7	85.7	129.7	2,760	+ 5	4.48	1,022,916	22,811	1,045,727	2M	12	45	III light.

AT POINT BREEZE. LOWER SECTION (757 MILES BELOW CAIRO).

1913.																		
Feb. 17	46.75	[1] 51.6	+0.10	199,216	200,353	70.1	70.5	128.8	2,842	.....	7.55	1,503,184	6,943	1,510,127	M	10	60	V.
22	47.12	52.0	+ .04	191,895	191,895	67.5	67.5	125.6	2,844	−8,458	7.45	1,428,925	7,467	1,436,392	M	15	67	
23	47.00	51.9	− .12	192,717	193,001	67.7	67.8	129.5	2,845	+1,106	7.66	1,475,410	7,336	1,482,746	M	14	104	VII light.
24	46.90	51.7	− .10	191,495	192,347	67.4	67.7	129.7	2,840	− 654	7.56	1,448,479	7,074	1,455,553	F	14	95	XII brisk.
28	45.82	50.8	− .32	181,631	185,037	64.0	65.2	124.3	2,838	+7,310	6.75	1,225,682	5,895	1,231,577	2M	15	70	IX very light.
Mar. 3	44.30	49.1	− .65	176,623	184,830	62.4	65.3	123.6	2,830	+ 207	6.25	1,103,916	3,668	1,107,584	2M	14	63	IV to VIII light.
4	43.62	48.4	− .68	175,820	186,000	62.2	65.8	120.8	2,828	−1,170	5.73	1,007,124	2,750	1,009,874	2M	15	69	Calm.

[1] Elevation of zero is mean Gulf level; datum areas at this section are computed below 51.9 feet on this gauge.
[2] Elevation of zero 20.12 feet below mean Gulf level; datum areas at this section are computed below 75.6 feet on this gauge.
[3] Interpolated.

The lower section was 2 miles below the end of the levee on the right bank at Point Breeze and was the same as used in 1911.
The upper section was at the end of the levee on Point Breeze and was the same as used in 1912.
The new upper section was about 300 feet above the 1912 section on the right bank and one-half mile above on the left bank.
The 8 a. m. readings of the Red River Landing United States engineer gauge are tabulated in the standard gauge column; elevation of zero 3.57 feet above mean Gulf level.
Price meters Nos. 29, 38, 244, and 309 were used.
For note on method see page 3488.
Observations and reduction under direction of Maj. Clarke S. Smith, Corps of Engineers, U. S. Army, secretary Mississippi River Commission.

TABLE No. 8.—*Results of discharge observations, Mississippi River*—Continued.

AT RED RIVER LANDING, LA. (765.3 MILES BELOW CAIRO).

Date.	Gauges.			Cross section of discharge.						Scour or fill	Mean velocity per second.	Discharge per second	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
	Standard gauge.	Local.	Change in 24 hours.	Area.		Depth.												
				Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.									
1913.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Feet.*	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*				
Feb. 13	45.9	45.9	+0.4	245,854	266,638	55.6	60.3	82.0	4,425	.....	4.62	1,136,788	2,660	1,139,448	M	18	76	X brick.
15	46.4	46.5	+ .2	[1] 245,824	.....	55.6	.....	.....	4,425	.....	4.53	1,113,638	3,060	1,116,698	M	19	.....	IX.
18	46.9	46.9	+ .1	244,907	261,266	55.3	59.0	84.6	4,425	− 5,372	4.62	1,131,701	3,662	1,135,363	M	19	90	Calm.
19	47.0	47.0	+ .1	[1] 243,079	.....	54.9	.....	.....	4,425	.....	4.71	1,145,431	3,762	1,149,193	M	19	.....	XII.
20	47.0	47.0	.0	243,079	258,995	54.9	58.5	86.0	4,425	− 2,271	4.60	1,117,088	4,787	1,121,875	2M	19	100	V light.
22	47.1	47.0	.0	245,984	261,458	55.6	59.1	84.9	4,425	+ 2,463	5.18	1,273,740	5,812	1,279,552	F	19	101	II light.
23	47.0	47.0	− .1	228,221	244,137	51.6	55.2	80.4	4,425	−17,321	4.46	1,016,806	5,812	1,022,618	M	19	73	V light.
24	46.9	46.9	− .1	232,051	248,410	52.4	56.1	80.4	4,425	+ 4,273	4.50	1,043,273	3,662	1,046,935	M	19	64	I brisk.
25	46.7	46.7	− .2	225,551	242,795	51.0	54.9	80.4	4,425	− 5,615	4.50	1,013,726	3,450	1,017,176	2M	19	65	IV light.
27	46.2	46.1	− .2	234,621	254,077	53.0	57.4	82.4	4,425	+11,282	4.34	1,019,486	2,855	1,022,341	2M	19	117	IX brisk.
28	45.8	45.8	− .4	233,815	255,041	52.8	57.6	83.7	4,425	+ 964	4.41	1,030,791	2,400	1,033,191	M	19	105	X light.
Mar. 1	45.4	45.4	− .4	219,939	242,935	49.7	54.9	77.5	4,425	−12,106	4.48	985,338	2,000	987,338	2M	19	72	XI brisk.
2	45.0	44.8	− .4	221,209	245,975	50.0	55.6	77.6	4,425	+ 3,040	4.32	954,850	1,400	956,250	2M	19	69	XII light.
3	44.3	44.2	− .7	224,457	252,313	50.9	57.2	79.9	4,405	+ 6,338	4.33	971,668	800	972,468	M	20	89	VIII light.
4	43.6	43.5	− .7	221,136	252,072	50.3	57.3	79.8	4,395	− 241	4.25	939,779	100	939,879	M	19	77	Calm.
Apr. 29	50.0	50.0	− .3	232,495	235,159	52.4	53.0	80.4	4,440	−16,913	4.68	1,087,658	41,169	1,128,827	2M	18	83	Do.
May 2	50.0	50.0	.0	225,764	228,428	50.8	51.4	78.0	4,440	− 6,731	4.72	1,066,156	41,169	1,107,325	2M	18	60	VI brisk.
3	50.2	50.1	+ .2	244,692	246,468	55.1	55.5	88.2	4,440	+18,040	5.01	1,226,179	41,961	1,268,140	2M	18	75	VI very light.
4	50.2	50.2	.0	231,550	233,326	52.2	52.6	81.0	4,440	−13,142	4.95	1,146,972	42,753	1,189,725	2M	18	84	IV brisk.
5	50.4	50.3	+ .2	227,497	228,385	51.2	51.4	79.8	4,440	− 4,941	4.65	1,058,640	42,765	1,101,405	2M	18	81	Calm to brisk.
6	50.4	50.4	.0	244,105	244,993	55.0	55.2	88.1	4,440	+16,608	5.04	1,229,603	42,770	1,272,373	2M	18	67	VII light.
7	50.5	50.5	+ .1	241,590	242,034	54.4	54.5	86.9	4,440	− 2,959	4.66	1,125,458	42,775	1,168,233	2M	18	105	I light.
8	50.6	50.6	+ .1	241,771	241,771	54.4	54.4	88.0	4,440	− 263	5.23	1,263,577	42,787	1,306,364	F	19	81	Calm.
10	50.6	50.5	.0	243,604	243,604	54.9	54.9	89.0	4,440	+ 1,833	4.69	1,142,592	42,022	1,184,614	2M	18	67	XII light.
11	50.5	50.4	− .1	227,329	227,773	51.2	51.3	80.0	4,440	−15,831	4.54	1,032,926	41,788	1,074,714	2M	18	84	I light.
12	50.4	50.4	− .1	224,021	224,909	50.5	50.7	81.6	4,440	− 2,864	4.56	1,020,560	41,367	1,061,927	2M	18	80	IV very light.
13	50.2	50.2	− .2	243,094	244,870	54.8	55.2	88.0	4,440	+19,961	5.13	1,248,126	39,890	1,287,956	F	19	68	II very light.
14	50.0	50.0	− .2	223,813	226,477	50.8	51.4	80.1	4,440	−18,393	4.52	1,012,256	38,471	1,050,727	2M	18	81	VI light.
15	49.8	49.7	− .2	235,064	238,616	50.3	51.1	87.1	4,440	+12,139	5.08	1,193,622	36,696	1,230,318	2M	18	65	VI strong.
16	49.5	49.4	− .3	223,009	227,893	50.2	51.3	79.4	4,440	−10,723	4.47	997,215	35,031	1,032,246	2M	18	74	VII very light.
17	49.2	49.1	− .3	226,534	232,750	51.0	52.4	82.9	4,440	+ 4,857	4.43	1,003,710	33,376	1,037,086	2M	18	90	VIII very light.
18	48.8	48.8	− .4	221,355	229,347	49.8	51.6	81.6	4,440	− 3,403	4.50	996,515	31,711	1,028,226	2M	18	89	Calm.
19	48.4	48.3	− .4	214,541	224,309	48.3	50.5	80.4	4,440	− 5,038	4.58	983,104	28,963	1,012,067	2M	17	87	Calm to brisk.
20	47.9	47.8	− .5	215,989	227,976	48.6	51.3	81.3	4,435	+ 3,667	4.49	969,798	26,263	996,061	2M	18	78	VI light.

[1] Interpolated.

The discharge section was the same as used in 1912 and previous years.

The gauge readings tabulated are from the United States engineer gauge at Red River Landing. The 8 a. m. readings are given in the standard-gauge column and the readings at the time of making discharge measurements are given in the local gauge column. Datum areas were computed below 50.6 feet on the gauge. Overbank discharge was measured on the right bank Feb. 19 and 22, Mar. 4, May 2, 8, and 13, and on the left bank May 8 and 13. All overbank discharges were deduced from these measurements. For note on method, see page 3488.

The meters used were Price Nos. 22, 29, 38, 243, 244, 308, 310, and Haskell meter No. 105, wheel IX.

Observations and reductions made under the direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary Mississippi River Commission.

AT CARROLLTON, LA. (957 MILES BELOW CAIRO).

Feb. 10	15.6	15.6	+0.2	179,384	187,339	83.4	87.1	105.0	2,150		5.85	1,048,815	2,650	1,051,465	2M	10	18	III light.
11	15.7	15.8	+ .1	180,309	188,049	83.9	87.5	106.0	2,150	+ 710	5.92	1,068,067	2,650	1,070,717	2M	11	35	VIII brisk.
12	16.0	16.0	+ .3	181,648	188,743	84.5	87.8	107.0	2,150	+ 694	6.01	1,092,504	2,650	1,095,154	2M	10	35	XII brisk.
12		16.0		181,648					2,150		6.01	1,060,536	2,650	1,063,186	F	15		II brisk.
13	16.2	16.3	+ .2	182,560	189,010	84.9	87.9	109.1	2,150	+ 267	6.01	1,096,802	2,594	1,099,396	2M	10	40	Do.
14	16.4	16.3	+ .2	180,678	187,128	84.0	87.0	107.5	2,150	− 1,882	6.07	1,096,455	2,537	1,098,992	2M	15	43	I light.
15	16.4	16.4	.0	181,711	187,946	84.5	87.4	107.0	2,150	+ 818	6.04	1,096,717	2,671	1,099,388	2M	15	37	Calm.
15		16.4		181,711					2,150		6.24	1,133,652	2,671	1,136,323	F	14		Do.
16	16.5	16.5	+ .1	[1] 182,126					2,150		5.97	1,088,129	2,806	1,090,935	2M	12		Do.
17	16.6	16.7	+ .1	182,756	188,346	85.0	87.6	108.1	2,150	+ 400	5.92	1,082,387	3,050	1,085,437	2M	13	30	IX very light.
17		16.7		182,756					2,150		5.92	1,103,122	3,050	1,106,172	F	13		II light.
18	16.7	16.7	+ .1	182,976	188,566	85.1	87.7	108.1	2,150	+ 220	5.91	1,081,634	2,700	1,084,334	2M	13	42	Do.
19	17.0	17.0	+ .3	182,365	187,310	84.8	87.1	108.0	2,150	− 1,256	6.03	1,098,993	2,427	1,101,420	2M	14	42	I light.
19	17.0	17.0		182,365					2,150		6.00	1,191,904	2,427	1,194,331	F	13		XII light.
20	17.0	16.9	.0	182,395	188,555	84.8	87.2	108.1	2,150	+ 1,245	6.14	1,085,560	2,875	1,088,435	2M	14	35	XI light.
20		16.9		[2] 182,395					2,150		6.14	1,127,329	2,875	1,130,204	F	14		I light.
21	17.0	16.9	.0	[1] 183,130					2,150		6.05	1,108,380	3,464	1,111,844	2M	14		VI strong.
22	17.0	17.0	.0	184,080	189,025	85.6	87.9	108.1	2,150	+ 470	6.16	1,140,089	3,914	1,144,003	2M	12	37	I light.
22		17.0		184,080					2,150		6.21	1,176,766	3,914	1,180,680	F	15		I brisk.
23	17.0	17.0	.0	[1] 180,692					2,150		6.10	1,102,270	3,514	1,105,784	2M	12		III strong.
24	17.0	17.0	.0	177,740	182,685	82.7	85.0	108.1	2,150	− 6,340	6.24	1,109,369	3,113	1,112,482	2M	12	47	XII brisk.
25	16.9	17.0	− .1	177,062	182,007	82.4	84.7	108.0	2,150	− 678	6.12	1,084,252	2,712	1,086,964	2M	15	35	III brisk.
26	16.7	16.8	− .2	178,110	183,700	82.8	85.4	106.0	2,150	+1,693	6.01	1,070,341	3,338	1,073,679	2M	13	53	
27	16.6	16.7	− .1	177,610	182,770	82.6	85.0	107.0	2,150	− 930	5.95	1,056,449	3,872	1,060,321	2M	12	45	IV brisk.
27		16.7		177,610					2,150		5.95	1,100,973	3,872	1,104,845	F	15		Brisk to strong.
28	16.4	16.4	− .2	176,839	183,074	82.3	85.2	105.0	2,150	+ 304	5.96	1,054,412	2,664	1,057,076	2M	14	35	V light.
Mar. 1	16.2	16.4	− .2	176,515	182,965	82.1	85.1	106.0	2,150	− 109	5.80	1,024,019	3,246	1,027,265	2M	14	40	XII brisk.
Apr. 19	17.6	17.8	+ .2	177,967	181,182	82.8	84.3	110.0	2,150	−1,783	6.23	1,108,484	2,806	1,111,290	F	10	34	VI light.
20	17.9	18.0	+ .3	184,163	187,173	85.7	87.1	110.9	2,150	+5,991	6.08	1,120,206	3,892	1,124,098	M	13	31	III brisk.
21	18.1	18.1	+ .2	183,333	185,913	85.3	86.5	110.9	2,150	−1,260	6.19	1,134,243	5,864	1,140,107	M	13	36	II light.
22	18.3	18.4	+ .2	180,918	183,068	84.1	85.1	110.4	2,150	−2,845	6.19	1,119,139	5,248	1,124,387	M	12	38	III strong.
22		18.4		180,918					2,150		6.13	1,108,770	5,248	1,114,018	F	10		III brisk.
23	18.5	18.5	+ .2	[1] 180,293					2,150		6.24	1,124,836	5,652	1,130,488	M	13		II strong.
24	18.6	18.7	+ .1	181,848	183,138	84.6	85.2	111.0	2,150	+ 70	6.45	1,173,814	5,114	1,178,928	M	13	36	V light.
25	18.8	18.8	+ .2	180,398	181,473	83.9	84.4	110.0	2,150	−1,665	6.57	1,185,027	6,244	1,191,271	M	13	31	IX light.
25		18.8		180,398					2,150		6.48	1,168,808	6,244	1,175,052	F	12		XI light.
26	19.0	18.9	+ .2	183,183	184,043	85.2	85.6	111.0	2,150	+2,570	6.42	1,176,350	5,810	1,182,168	M	14	35	II light.
27	19.0	19.1	.0	181,758	182,188	84.5	84.7	111.0	2,150	−1,855	6.49	1,178,772	6,280	1,185,052	M	13	30	XII light.
28	19.2	19.1	+ .2	181,283	181,713	84.3	84.5	111.0	2,150	− 475	6.42	1,163,523	6,031	1,169,554	M	13	34	XI light.

[1] Interpolated.

[2] Used preceding soundings.

TABLE No. 8.—*Results of discharge observations, Mississippi River*—Continued.

AT CARROLLTON, LA. (957 MILES BELOW CAIRO)—Continued.

Date.	Gauges.			Cross section of discharge.						Scour or fill.	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
	Standard gauge.	Local.	Change in 24 hours.	Area.		Depth.												
				Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.									
1913.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Feet.*	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*				
Apr. 28	.....	19.1	.....	181,498	.....	.....	.....	.....	2,150	.....	6.55	1,189,715	6,031	1,195,746	F	12	.....	XI light.
29	18.8	18.8	− .4	182,679	183,754	85.0	85.5	109.0	2,150	+2,041	6.04	1,102,692	6,357	1,109,049	2M	13	29	II light.
30	18.8	18.8	.0	180,315	181,390	83.9	84.4	110.0	2,150	−2,364	6.24	1,125,525	6,210	1,131,735	2M	14	33	XII light.
May 1	18.8	18.7	.0	182,102	183,392	84.7	85.3	111.0	2,150	+2,002	6.32	1,151,736	5,286	1,157,022	2M	13	40	VI light.
1	.....	18.7	.....	182,102	.....	.....	.....	.....	2,150	.....	6.41	1,167,307	5,286	1,172,593	F	10	.....	Do.
2	18.7	18.7	− .1	181,570	182,860	84.5	85.1	110.0	2,150	− 532	6.36	1,154,790	5,150	1,159,940	2M	13	35	V light.
3	18.8	18.8	+ .1	182,576	183,651	84.9	85.4	110.0	2,150	+ 791	6.21	1,134,464	6,833	1,141,297	2M	13	38	IV light.
4	19.0	18.9	+ .2	181,254	182,114	84.3	84.7	110.0	2,150	−1,537	6.33	1,147,342	6,588	1,153,930	2M	15	41	V brisk.
5	19.0	19.0	.0	181,889	182,534	84.6	84.9	110.0	2,150	+ 420	6.37	1,159,522	5,175	1,164,697	2M	14	35	V light.
5	.....	19.0	.....	181,889	.....	.....	.....	.....	2,150	.....	6.35	1,155,852	5,175	1,161,027	F	11	.....	Do.
6	19.0	19.0	.0	183,128	183,773	85.2	85.5	112.0	2,150	+1,239	6.07	1,112,168	5,500	1,117,668	2M	13	33	Calm.
7	19.0	19.1	.0	181,009	181,654	84.2	84.5	110.0	2,150	−2,119	6.49	1,174,481	5,575	1,180,056	2M	13	35	X light.
8	19.2	19.3	+ .2	180,363	180,363	83.9	83.9	109.0	2,150	−1,291	6.41	1,155,613	5,819	1,161,432	2M	13	38	III light.
8	.....	19.2	.....	[1] 180,041	.....	.....	.....	.....	2,150	.....	6.46	1,162,911	5,819	1,168,730	F	12	.....	IV light.
9	19.1	19.2	− .1	181,901	182,331	84.6	84.8	110.0	2,150	+1,968	6.42	1,167,127	5,575	1,172,702	2M	13	32	Calm.
10	19.0	19.0	− .1	182,046	182,691	84.7	85.0	108.0	2,150	+ 360	6.36	1,157,632	6,311	1,163,943	2M	13	33	Do.
11	19.0	19.1	.0	182,274	182,704	84.8	85.0	110.0	2,150	+ 13	6.50	1,184,874	7,029	1,191,903	2M	13	31	XI light.
12	19.0	19.2	.0	177,298	177,728	82.5	82.7	109.0	2,150	−4,976	6.39	1,132,960	6,783	1,139,743	2M	13	26	X brisk.
13	19.0	19.1	.0	176,306	176,736	82.0	82.2	110.0	2,150	− 992	6.48	1,142,964	7,274	1,150,238	2M	13	30	X light.
13	.....	19.1	.....	176,306	.....	.....	.....	.....	2,150	.....	6.38	1,124,350	7,274	1,131,624	F	12	.....	Calm.
14	18.9	19.0	− .1	180,491	181,136	83.9	84.2	109.0	2,150	+4,400	6.42	1,158,611	6,601	1,165,212	2M	13	35	IX light.
15	18.8	18.8	− .1	180,341	181,416	83.9	84.1	110.0	2,150	+ 280	6.31	1,138,216	7,229	1,145,445	2M	13	32	VI light.
16	18.8	18.7	.0	179,101	180,391	83.3	83.9	109.0	2,150	−1,025	6.28	1,125,590	7,024	1,132,614	2M	13	29	Do.
16	.....	18.7	.....	179,101	.....	.....	.....	.....	2,150	.....	6.01	1,076,068	7,024	1,083,092	F	12	.....	Do.
17	18.7	18.7	− .1	182,196	183,486	84.7	85.3	110.0	2,150	+3,095	6.21	1,130,953	6,403	1,137,356	2M	13	29	XI light.
18	18.5	18.6	− .2	183,877	185,382	85.5	86.2	110.0	2,150	+1,896	5.96	1,095,384	6,678	1,102,062	2M	13	28	Do.
19	18.2	18.3	− .3	183,638	186,003	85.4	86.5	108.0	2,150	+ 621	5.85	1,074,356	5,536	1,079,892	2M	13	26	Calm.
20	17.9	17.9	− .3	183,638	186,648	85.4	86.8	109.0	2,150	+ 645	5.90	1,083,980	4,897	1,088,877	2M	13	29	VIII light.
20	.....	17.9	.....	183,638	.....	.....	.....	.....	2,150	.....	5.76	1,057,415	4,897	1,062,312	F	12	.....	VII light.

[1] Interpolated.

The discharge section was the same used in 1912 and earlier years.

The 8 a. m. readings on the United States engineer gauge at Carrollton are tabulated in the standard gauge column. The readings on the same gauge at the time of discharge measurements are given in the local gauge column. The elevation of the zero of the gauge is 0.13 foot below mean Gulf level.

Datum areas were computed below 19.3 feet on the gauge.

For note on method see page 3488.

Price meters Nos. 23 and 310 and Haskell meter No. 105, wheel No. IX, were used during February and March, and Price meters Nos. 43 and 322 were used during April and May.

Observations and reduction made under the direction of Maj. Clarke S. Smith, Corps of Engineers, U. S. Army, secretary of Mississippi River Commission.

OHIO RIVER AT METROPOLIS, ILL. (35 MILES ABOVE CAIRO).

1913.																		
Jan. 18	44.9	9.2	.....	191,450	200,630	56.3	59.0	76.0	3,400	.....	6.40	1,225,094	[1] 17,329	1,242,423	M	11	40	V light.
19	.....	9.7	+0.5	199,635	207,115	58.7	60.9	77.0	3,400	+6,485	6.40	1,277,145	18,814	1,295,959	M	11	51	III light.
21	46.8	10.9	+1.2	207,590	210,990	61.1	62.1	79.5	3,400	+3,875	6.11	1,268,324	22,376	1,290,700	M	11	63	IX light.
21	.....	11.0	.....	207,930	.....	.....	.....	.....	3,400	.....	6.25	1,299,562	22,376	1,329,938	F	11	.....	Calm.
22	47.1	11.3	+ .4	211,065	213,105	62.1	62.7	80.0	3,400	+2,115	5.91	1,246,859	[1] 24,213	1,271,072	2M	11	75	X to I light.
22	.....	11.3	.....	211,065	.....	.....	.....	.....	3,400	.....	6.26	1,321,866	[1] 24,213	1,346,079	F	11	.....	X light.
23	47.4	11.7	+ .4	216,155	216,835	63.6	63.8	81.0	3,400	+3,730	5.98	1,292,186	26,050	1,318,236	M	11	34	VI light.
24	47.5	11.8	+ .1	218,015	218,355	64.1	64.2	83.0	3,400	+1,520	5.97	1,300,920	26,718	1,327,638	2M	11	71	VIII light.
25	47.6	11.8	.0	214,283	214,623	63.0	63.1	82.0	3,400	−3,732	5.82	1,247,598	25,490	1,273,088	2M	11	55	II light.
25	.....	11.8	.....	214,283	.....	.....	.....	.....	3,400	.....	5.92	1,268,911	25,490	1,294,401	F	11	.....	III light.
26	.....	11.8	.0	213,005	213,345	62.7	62.8	83.0	3,400	−1,278	5,98	1,272,832	25,825	1,298,657	2M	11	61	Do.
27	47.5	11.85	+ .5	219,680	219,850	64.6	64.65	82.0	3,400	+6,505	5.84	1,282,154	27,655	1,309,809	2M	10	57	VII brisk.
28	.....	11.9	+ .05	219,705	219,705	64.6	64.6	82.0	3,400	− 145	5.76	1,265,923	[1] 26,091	1,292,014	M	10	53	III brisk.
28	.....	11.9	.....	219,705	.....	.....	.....	.....	3,400	.....	6.04	1,326,095	[1] 26,091	1,352,186	F	11	.....	III light.
29	47.5	11.8	− .1	220,750	221,090	64.9	65.0	82.0	3,400	+1,385	5.79	1,278,958	26,528	1,305,486	2M	11	46	Do.
30	47.4	11.7	− .1	214,920	215,600	63.2	63.4	81.0	3,400	−5,490	6.01	1,291,654	25,364	1,317,018	2M	11	42	II light to brisk.
31	47.4	11.8	+ .1	214,915	215,255	63.2	63.3	82.0	3,400	− 345	5.84	1,254,264	27,626	1,281,890	2M	10	58	VII strong.
Feb. 1	47.3	11.7	− .1	215,655	216,335	63.4	63.6	81.0	3,400	+1,080	6.02	1,299,159	24,627	1,323,786	2M	11	33	VIII light.

[1] Interpolated.

NOTES.

The readings given in the standard gauge column are from the Paducah, Ky., United States engineer gauge. Zero of gauge is 286.26 feet above mean sea level.

The readings given in the local gauge column were taken on a gauge at the discharge section at the time of discharge observations. Elevation of local gauge zero is 318.65 feet determined from United States bench mark No. 4, elevation of bench mark obtained from resident engineer, Chicago, Burlington & Quincy Ry.

Datum areas were computed below 11.9 feet on the local gauge. The change in 24 hours is taken from the local gauge.

M denotes one meter, and 2M simultaneous measurements with two meters run at 6/10 depths. F denotes double floats, the lower one run at mid depth.

Price meter No. 23 was used on Jan. 18, 19, 21, and 28. Haskell meter No. 105, wheel 1-x, was used Jan. 23, the remaining days both meters were run simultaneously and the mean of their results tabulated.

The discharge section was about opposite the end of Metropolis Street. The overbank was measured along a line of telephone poles on the left bank.

Observations and reduction made under direction of Maj. Clarke S. Smith, Corps of Engineers, U. S. Army, secretary Mississippi River Commission.

TABLE No. 8.—*Results of discharge observations, Mississippi River and tributaries*—Continued.

CUMBERLAND RIVER AT NASHVILLE, TENN. (190.5 MILES ABOVE MOUTH).

Date.	Gauges.			Cross section of discharge.						Scour or fill	Mean velocity per second.	Discharge per second.	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
	Standard gauge.	Local.	Change in 24 hours.	Area.		Depth.												
				Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.									
1913.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Feet.*	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*				
Jan. 16	48.0	47.9	−0.3	24,414	24,414	47.4	47.4	60	515	.....	5.55	135,608	3,570	139,178	F	7	10	X light.
17 (a. m.)	47.1	47.0	− .9	24,585	25,049	47.7	48.6	59	515	+635	5.26	129,299	2,520	131,819	F	6	20	None.
17 (p. m.)	.....	46.8	.....	24,482	25,049	47.5	48.6	.....	515	000	5.08	124,327	2,400	126,727	F	7	.....	II light.
18	45.2	44.3	−1.9	23,219	25,145	43.4	47.0	56	535	+ 96	4.69	108,992	.....	108,992	F	5	10	VI.

The discharge section was one-half mile above the Sparkman Street bridge, at Nashville, Tenn.

The readings tabulated in the standard gauge column are the 8 a. m. readings on the United States engineer gauge at Nashville; those tabulated in the local gauge column are on the same gauge at the time of measuring the discharge.

Datum areas were computed below 47.9 feet on the gauge.

Velocities were measured with double floats, the lower float was run at mid depth.

Observations and reduction made under direction of Maj. Clarke S. Smith, Corps of Engineers, U. S. Army, secretary Mississippi River Commission.

ST. FRANCIS RIVER (8 MILES ABOVE MOUTH).

1913.																		
Feb. 14	46.6	2.5	.....	38,191	38,191	46.1	46.1	60.9	828	.....	.....	.....	.....	.....	.....	.....	.....	
14	.....	2.4	.....	[1] 38,108	.....	.....	.....	.....	828	.....	1.58	60,134	.....	.....	2M	4	53	IX to X very light.
14	.....	2.4	.....	[1] 38,108	.....	.....	.....	.....	828	.....	1.74	66,351	.....	.....	F	4	.....	Do.
14	.....	2.3	.....	[1] 38,025	.....	.....	.....	.....	828	.....	1.63	62,017	.....	.....	2M	4	.....	IX very light.
15	45.4	1.4	−1.1	37,634	38,535	46.0	47.1	60.7	819	+344	1.96	73,610	.....	.....	2M	8	48	X brisk.
15	.....	1.4	.....	37,634	38,535	46.0	47.1	60.7	819	.....	2.03	76,340	.....	.....	F	4	.....	Do.
15	.....	1.1	.....	[1] 37,388	.....	.....	.....	.....	819	.....	2.02	75,340	.....	.....	2M	7	.....	Do.
15	.....	.9	.....	[1] 37,224	.....	.....	.....	.....	819	.....	2.28	84,829	.....	.....	F	4	.....	Do.

[1] Areas from preceding soundings corrected for change in stage.

The 8 a. m. readings of the United States engineer gauge at Helena, Ark., are tabulated in the standard gauge column. The elevation of the zero of this gauge is 141.81 feet above mean Gulf level.

The readings taken at time of observations tabulated in the local gauge column, are taken from gauge set on discharge range. Elevation of zero of local gauge was not determined.

Datum areas were computed below 2.5 feet on local gauge, which is bank-full stage.

In the column headed method F indicates double floats, and 2M the mean of two meters. Price meters No. 29 and No. 244 were used exclusively.

The lower float was run at mid depth, the meters at 6/10 depth.

Discharge section used was a temporary section established at Morgans Landing, 8 miles above the mouth and just below the junction of the St. Francis and L'Anguille Rivers.

The increased discharge on a falling stage shown above is due to the outflow of backwater from the Mississippi River, and does not represent actual discharge of St. Francis River.

Observations and reduction made under direction of Maj. Clarke S. Smith, Corps of Engineers, U. S. Army, secretary Mississippi River Commission.

YAZOO RIVER AT REDWOOD, MISS. (18 MILES ABOVE MOUTH).

1913.																		
Mar. 17	37.1	86.5	−0.7	26,043	39,246	35.7	37.3	67.7	730	.....	3.27	85,120	.....	85,120	M	14	35	No record.
18	36.4	86.0	−0.5	25,779	39,347	35.3	37.4	68.8	730	+ 101	3.46	89,206	.....	89,206	M	13	35	III light.
18	.....	86.0	.....	25,779	.....	.....	.....	.....	730	.....	3.43	88,431	.....	88,431	F	8	.....	Do.
19	35.5	85.4	−0.6	25,213	39,217	34.8	37.3	65.7	725	− 130	3.58	90,337	.....	90,337	M	13	33	V brisk.
19	.....	85.4	.....	25,213	.....	.....	.....	.....	725	.....	3.30	89,458	.....	89,458	F	8	.....	Do.
20	34.7	84.8	−0.6	26,430	40,869	36.5	38.8	64.5	725	+1,652	3.47	91,683	.....	91,683	F	12	33	IV very light.
Apr. 29	52.3	101.3	.....	36,033	36,033	34.3	34.3	84.2	1,052	−4,836	1.90	68,380	50,888	119,268	M	16	50	Very light.
30	52.2	101.2	−0.1	37,669	35,928	35.8	35.9	80.4	1,052	− 105	1.79	67,271	51,181	118,452	M	18	37	Calm.
30	.....	101.2	.....	37,669	.....	.....	.....	.....	1,052	.....	1,68	63,260	51,181	114,441	F	6	.....	Do.

The discharge section was at the Yazoo & Mississippi Valley Railway bridge at Redwood, Miss.

The readings tabulated for the standard gauge are from the United States engineer gauge at Vicksburg; elevation of zero 46.16 feet above mean Gulf level.

The local gauge was on the bridge at the discharge section.

Datum areas were computed below 101.3 feet on the local gauge.

The change in 24 hours was taken from the local gauge.

In the column of method M denotes meter and F denotes double floats. Meters were run at $\frac{6}{10}$ depth, and the lower float at mid-depth.

Price meter No. 38 was used on March 19; overbank discharge was measured with Price meter No. 34; all other meter measurements were made with Price meter No. 309.

Observations and reduction made under direction of Maj. Clarke S. Smith, Corps of Engineers, U. S. Army, secretary Mississippi River Commission.

BLACK RIVER AT JONESVILLE, LA. (54 MILES ABOVE MOUTH).

1913.																		
May 15	49.6	56.6	.....	45,998	45,998	40.5	40.5	72.0	1,135	.....	2.21	101,565	17,958	119,523	F	13	40	Calm.
15	.....	56.6	.....	45,998	.....	.....	.....	.....	1,135	.....	2.46	112,998	16,821	129,819	M	11	.....	Do.
16	49.3	56.6	0.0	45,995	45,995	40.5	40.5	71.0	1,135	−3	2.38	109,255	18,042	127,297	F	10	37	XII light.

The readings tabulated in the standard gauge column are taken from the Mississippi River Commission gauge at Barbre Landing, La.; elevation of zero 3.88 feet above mean Gulf level.

The readings tabulated in the local gauge column are elevations of water surface above mean Gulf level. The change in 24 hours is taken from the local gauge.

In the column of method M denotes meter and F denotes double floats. Meters were run at $\frac{6}{10}$ depth, the lower float at mid-depth.

Price meter No. 309 was used.

The discharge section was about ½ mile below the mouth of Little River. The water in Little River was flowing toward Catahoula Lake and is tabulated as overbank discharge.

Observations and reduction made under direction of Maj. Clarke S. Smith, Corps of Engineers, U. S. Army, secretary Mississippi River Commission.

TABLE No. 8.—*Results of discharge observations, Mississippi River and tributaries*—Continued.

BLACK RIVER (1 MILE ABOVE MOUTH).

Date.	Gauges.			Cross section of discharge.						Scour or fill	Mean velocity per second.	Discharge per second	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
	Standard gauge.	Local.	Change in 24 hours.	Area.		Depth.												
				Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.									
1913.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Feet.*	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*				
Feb. 18	44.4	48.4	+0.1	26,444	26,944	42.2	43.2	60.5	626	.....	1.28	33,747	.....	.....	F	6	20	VII light.
26	45.1	49.2	− .1	27,148	27,148	43.5	43.5	61.1	624	+204	1.17	31,883	.....	.....	F	7	24	III light.
Mar. 5	42.5	48.2	− .7	26,149	26,771	42.1	42.8	58.7	621	−377	1.88	49,171	.....	.....	F	7	34	IX light.

The discharge section was the same used in 1911.

The 8 a. m. readings of the Mississippi River Commission gauge at Barbre Landing are tabulated in the standard gauge column; elevation of zero 3.88 feet above mean Gulf level. The zero of the local gauge was at mean Gulf level.

The change in 24 hours was taken from the standard gauge.

Datum areas were computed below 49.2 feet on the local gauge.

Velocities were measured with double floats; the lower float was run at mid-depth.

Observations and reduction made under direction of Maj. Clarke S. Smith, Corps of Engineers, U. S. Army, secretary Mississippi River Commission.

RED RIVER, NEAR GARDNERS LANDING (56 MILES ABOVE MOUTH).

1913.																		
May 17	17.3	1.5	.....	16,486	16,486	31.2	31.2	46.0	529	.....	1.84	30,407	.....	.....	F	6	17	Calm.
17	.....	1.5	.....	16,486	.....	.....	.....	.....	529	.....	1.75	28,823	.....	.....	M	7	.....	Do.
18	16.5	1.2	−0.3	16,889	17,021	31.9	32.1	47.0	529	+535	1.78	30,116	.....	.....	F	7	17	XI light.

The readings tabulated in the standard gauge column are from the United States Engineer gauge at Alexandria; elevation of zero, 44.18 feet above mean Gulf level.

Change in stage was taken from the local gauge.

The datum areas were computed below 1.5 feet on the local gauge.

In the column marked method M denotes meter, and F denotes double floats. Meters were run at 6/10 depth, and the lower float at mid depth.

Price meter No. 309 was used.

Observations and reduction made under direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary, Mississippi River Commission.

RED RIVER (1 MILE ABOVE THE MOUTH OF BLACK RIVER).

1913.																		
Feb. 18	44.4	48.4	+0.1	19,539	20,021	32.4	33.2	48.4	603	.....	1.12	21,796	.....	.....	F	6	17	VII brisk.
25	45.2	49.2	− .1	20,469	20,469	33.9	33.9	48.0	603	+448	1.36	27,841	.....	.....	F	6	10	I light.
Mar. 5	42.5	48.2	− .7	19,810	20,413	32.8	33.8	48.0	603	− 56	3.14	62,254	.....	.....	F	6	26	XII light.

The readings in the standard gauge column are taken from the Barbre Landing, Mississippi River Commission gauge; elevation of zero, 3.88 feet above mean Gulf level. The local gauge was about 1 mile below the mouth of Black River; elevation of zero is mean Gulf level.
The change in 24 hours is taken from the standard gauge.
Datum areas were computed below 49.2 feet on the local gauge.
Velocities were measured with double floats; the lower float was run at mid depth.
The section was the same as used in 1911.
Observations and reduction made under direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary, Mississippi River Commission.

RED RIVER (1 MILE BELOW THE MOUTH OF BLACK RIVER).

Feb. 19	44.7	48.5	+0.3	35,109	35,673	43.7	44.2	60.4	803	.....	1.81	63,413	.....	.....	F	7	25	Calm.
25	45.2	49.2	− .1	35,604	35,604	44.1	44.1	60.0	807	− 69	1.63	65,364	.....	.....	F	7	23	Do.
Mar. 5	42.5	48.2	− .7	33,791	34,595	42.2	42.9	58.0	800	−1,009	3.46	117,021	.....	.....	F	7	37	II light.

The discharge section was the same used in 1911.
The 8 a. m. readings of the Mississippi River Commission gauge at Barbre Landing are tabulated as standard; elevation of zero, 3.88 feet above mean Gulf level.
The change in 24 hours was taken from the standard gauge.
The zero of the local gauge was at mean Gulf level.
Velocities were measured with double floats; the lower float was run at mid depth.
Datum areas were computed below 49.2 feet on the local gauge.
Observations and reduction made under direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary, Mississippi River Commission.

ATCHAFALAYA RIVER, AT SIMMESPORT, LA. (5.5 MILES BELOW HEAD).

1913.																		
Feb. 15	.....	40.6	.....	63,486	64,994	54.7	56.0	84.1	1,160	.....	3.95	250,974	600	251,574	M	6	51	VI.
19	.....	41.6	.....	63,561	63,909	54.5	54.8	84.0	1,160	−1,085	3.97	251,110	800	251,910	2M	7	85	I very light.
27	42.0	41.9	0.0	64,987	64,987	56.0	56.0	85.0	1,160	+1,078	4.08	264,827	869	265,696	F	7	49	VIII light.
Mar. 2	.....	41.9	.....	63,718	63,718	54.9	54.9	84.8	1,160	−1,269	4.03	256,702	869	257,571	M	7	52	III light.
3	.....	40.7	.....	62,618	64,010	54.0	55.2	83.9	1,160	+ 292	3.89	243,321	600	243,921	F	7	58	II very light.
5	39.6	39.4	− .7	59,472	62,371	51.3	53.8	79.2	1,160	−1,639	3.76	223,408	545	223,953	2M	8	43	Calm.
6	38.8	38.8	− .8	59,491	63,087	51.3	54.4	79.3	1,160	+ 716	3.86	229,681	500	230,181	2M	8	47	II strong.
May 1	45.8	45.9	+ .1	68,477	69,694	56.3	57.3	89.4	1,217	.....	5.33	365,137	6,572	371,709	2M	8	68	V very light.
5	46.5	46.5	+ .4	69,346	69,833	57.0	57.4	88.2	1,217	+ 139	5.53	383,620	6,551	390,171	2M	8	51	VII brisk.
6	46.6	46.6	+ .1	69,324	69,689	57.0	57.3	88.1	1,217	− 144	5.34	369,990	7,235	377,225	2M	9	59	XI very light.
9	46.9	46.8	+ .1	68,813	68,935	56.5	56.6	88.0	1,217	+ 348	5.63	387,639	7,847	395,486	2M	9	48	Calm.
10	46.9	46.9	.0	64,934	64,934	53.4	53.4	82.2	1,217	−4,001	4.96	322,242	7,900	330,142	2M	9	55	Do.
12	46.8	46.8	− .1	68,489	68,611	56.3	56.4	87.0	1,217	+3,677	5.36	367,011	7,881	374,892	2M	10	36	Do.
13	46.7	46.7	− .1	69,236	69,479	56.9	57.1	88.9	1,217	+ 868	5.39	373,296	7,916	381,212	2M	8	45	VI very light.
17	45.8	45.8	− .2	69,441	70,780	57.1	58.2	86.1	1,217	+1,301	5.16	358,259	6,989	365,248	F	14	51	Calm.
19	45.1	44.9	− .7	66,016	68,450	54.2	56.2	86.1	1,217	−2,330	5.48	361,818	4,800	366,618	2M	8	46	IV brisk.
20	44.7	44.6	− .4	67,488	70,187	55.5	57.8	86.7	1,217	+1,737	5.19	350,408	4,457	354,865	2M	9	44	IV light.

The discharge section was the same used in 1911 and 1912, about ½ mile below Simmesport, La.
The gauge readings are from the U. S. Weather Bureau gauge at Simmesport; elevation of zero, 5.79 feet above mean Gulf level.
The 7 a. m. readings are given in the standard gauge column; the readings at the time of discharge measurements are given in the local gauge column.
Datum areas were computed below 46.9 feet on the gauge.
Overbank was measured on both banks. Price meters Nos. 22, 29, 38, 243, 244, 309, and 310, and Haskell meter No. 105 wheel IX were used in measuring velocities.
For note on method see p. 3488.
Observations and reduction made under direction of Maj. Clarke S. Smith, Corps of Engineers, U. S. Army, secretary Mississippi River Commission.

TABLE No. 8.—*Results of discharge observations, Mississippi River*—Continued.

OLD RIVER (2 MILES FROM MOUTH).

Date.	Gauges.			Cross section of discharge.						Scour or fill	Mean velocity per second.	Discharge per second	Discharge over bank per second.	Total discharge of river per second.	Method.	Number of velocity stations.	Number of soundings.	Direction and force of wind.
	Standard gauge.	Local.	Change in 24 hours.	Area.		Depth.												
				Water.	Below datum.	Mean.	Mean datum.	Maximum.	Width.									
1913.	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Sq. ft.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Sq. ft.*	*Feet.*	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*				
Feb. 14	46.2	48.0	+0.3	35,238	36,327	38.9	40.1	76.7	907	.....	4.91	173,113	13,700	186,813	M	7	33	
18	46.9	48.8	+ .1	37,994	38,357	41.9	42.3	81.6	907	−2,030	4.26	161,692	15,100	176,792	M	8	18	XII brisk.
20	47.0	49.1	.0	38,329	38,420	42.3	42.4	84.3	907	+ 63	3.87	148,311	15,600	163,911	M	8	21	I.
22	47.1	49.2	.0	36,518	36,518	40.3	40.3	82.9	907	−1,902	4.14	152,192	15,800	167,992	2M	5	27	IV light.
24	46.9	49.1	− .1	35,589	35,680	39.2	39.3	78.5	907	− 838	3.39	120,778	12,000	132,778	M	9	26	VII light.
25	46.7	48.9	− .2	35,520	35,792	39.5	39.5	78.4	900	+ 112	3.25	116,039	12,150	128,189	2M	8	22	XI brisk.
26	46.4	48.8	− .3	34,677	35,039	38.5	38.6	78.8	900	− 753	3.10	107,446	12,060	119,506	2M	8	18	Do.
27	46.2	48.6	− .2	35,255	35,797	39.3	39.5	79.6	897	+ 758	2.85	100,699	9,450	110,149	2M	9	13	IV light.
Mar. 1	45.4	47.9	− .4	34,102	35,252	38.2	38.9	77.5	893	− 545	2.30	78,466	7,300	85,766	2M	8	29	V light.
2	45.0	47.5	− .4	34,407	35,912	39.0	39.6	79.8	883	+ 660	2.22	76,535	6,900	83,435	F	6	32	VIII light.
3	44.3	46.8	− .7	33,231	35,354	37.6	39.0	78.7	883	− 558	1.61	53,415	5,100	58,515	2M	8	34	I brisk.
4	43.6	46.2	− .7	33,760	36,407	39.0	40.1	79.8	865	+1,053	1.32	44,498	3,500	47,998	F	6	27	XII light.

OLD RIVER, AT TEXAS & PACIFIC R. R. BRIDGE (2.5 MILES FROM MOUTH).

1913.																		
Apr. 30	50.0	52.6	0.0	38,382	39,252	39.7	40.6	.....	967	.....	2.63	100,680	175,741	276,421	2M	11	.....	Calm.
May 2	50.0	52.8	.0	38,480	39,157	39.8	40.5	64.2	967	− 95	2.60	99,942	163,874	263,816	2M	10	56	XII light.
3	50.2	52.9	+ .2	38,766	39,346	40.1	40.7	62.8	967	+ 189	2.38	92,296	153,256	245,552	2M	8	54	III brisk.
4	50.2	53.1	.0	39,249	39,636	40.6	41.0	65.3	967	+ 290	2.28	89,522	142,446	231,968	2M	8	70	XII brisk.
5	50.4	53.2	+ .2	39,256	39,546	40.6	40.9	62.8	967	− 90	1.66	65,173	130,118	195,291	2M	9	53	XII very light.
7	50.5	53.4	+ .1	38,142	38,239	39.4	39.5	64.3	967	−1,307	1.58	60,244	105,663	165,907	2M	8	49	VIII light.
8	50.6	53.5	+ .1	38,733	38,733	40.1	40.1	64.3	967	+ 494	1.32	51,248	89,932	141,180	2M	8	44	Calm.
9	50.6	53.5	.0	38,767	38,767	40.1	40.1	63.3	967	+ 34	1.16	45,075	74,091	119,166	2M	7	52	Do.
10	50.6	53.4	.0	38,154	38,251	39.5	39.6	62.3	967	− 516	.71	27,035	56,936	83,971	F	12	45	XII very light.
12	50.4	53.3	− .1	38,531	38,724	39.8	40.0	63.3	967	+ 473	.52	20,092	43,867	63,969	F	11	47	Do.
13	50.2	53.1	− .2	38,019	38,406	38.3	38.7	62.7	967	− 318	.37	14,047	34,957	49,004	F	9	44	XII light.
14	50.0	52.9	− .2	[1] 37,725	.....	.....	.....	.....	967	.....	.29	10,687	25,998	36,685	F	6	.....	X brisk.
16	49.5	52.4	− .3	37,152	38,216	38.4	39.5	61.3	967	− 190	.14	5,231	5,808	11,039	F	10	36	Calm.

17	49.2	52.1	− .3	36,827	38,146	38.1	39.5	60.2	967	− 70	.05	1,679	893	2,572	F	8	43	Do.
18	48.8	51.8	− .4	[2] 36,502					967		−.02	− 601	−3,388	− 3,989	F	8		Do.
19	48.4	51.4	− .4	[2] 36,043					967		−.10	−3,615	−7,510	−11,125	F	9		Do.
20	47.9	50.8	− .5	[2] 35,488					967		−.04	−1,411	−7,998	− 9,409	F	9		VI brisk

[1] Used areas from preceding observation. [2] Area interpolated.

The 8 a. m. readings on the United States engineer gauge at Red River Landing are tabulated in the standard gauge column; elevation of gauge zero 3.57 feet above mean Gulf level. The change in 24 hours is taken from the standard gauge. The local gauge was at the Texas & Pacific R. R. Bridge, and the readings tabulated for both sections were taken at the time of velocity observations.

Datum areas for February and March observations were computed below 49.2 feet on the local gauge. Datum areas in April and May are computed below 53.5 feet on the local gauge.

A minus sign (−) indicates discharge toward Mississippi River. All discharges prior to May 18 were toward the Atchafalaya River.

Overbank discharges were measured Feb. 21 and 25, and May 2, 7, 9, and 12; all overbank discharges were deduced from these measurements.

For note on method see p. 3488.

Observations and reductions made under direction of Maj. Clarke S. Smith, Corps of Engineers, U. S. Army, secretary Mississippi River Commission.

CREVASSES OF 1913—MISSISSIPPI RIVER BELOW CAIRO, ILL.

Locality.	Distance below Cairo and bank.	Date of break.	Date of measurement.	Width.	Discharge per second.	Gauge.			Method.
						Located at—	At date of break.	At date of measurement.	
	Miles.	1913.	1913.	*Feet.*	*Cu. feet.*		*Feet.*	*Feet.*	
Wilson, upper break	190 R	Apr. 9	Apr. 18	1,191	56,158	Fulton, Tenn	44.05	41.2	M.
Wilson, lower break	190 R	Apr. 9	do	1,624	106,076	do	44.05	41.2	M.
Random Shot	195 R	Apr. 9	do	1,656	119,226	do	44.05	41.2	M.
Graves Bayou	50 R	Apr. 8	Apr. 13	3,120	219,619	Mhoons Landing	44.60	44.3	M.
Lake Jefferson	(1)	Apr. 12	Apr. 21	1,161	129,344	Mouth of White River	53.40	55.2	M.
Beulah Lake	404 L	Jan. 25	Feb. 10	993	98,036	do	46.35	50.3	M.
Skipwith	530 L	Apr. 21	Apr. 28	3,619	293,744	Lake Providence	47.95	46.3	M.
Lake St. John	684 R	Apr. 27	May 6	2,700	202,810	St. Joseph	49.45	47.65	M and F.

[1] On Arkansas River 5 miles above mouth.

TABLE No. 8.—*Results of discharge observations, Mississippi River*—Continued.

RESULTS OF DISCHARGE MEASUREMENTS BETWEEN ARKANSAS CITY, ARK., AND TRIPPE JUNCTION, ARK., IN TENSAS BASIN ALONG THE ST. LOUIS, IRON MOUNTAIN & SOUTHERN R. R. TRACK.

Date.	Stage M. R. C. gauge at Arkansas City, Ark.	Area.	Mean depth.	Width.	Mean velocity per second.	Discharge per second.	Method.
1913.	*Feet.*	*Sq. feet.*	*Feet.*	*Feet.*	*Feet.*	*Cu. feet.*	
Apr. 19	55.0	50,633	10.65	4,756	1.91	96,632	F and M.
20	55.1	55,084	11.19	4,921	1.98	108,805	F and M.
23	55.1	59,792	10.72	5,580	2.02	120,568	M.
24	55.1	60,788	9.90	6,140	2.17	132,070	M.
25 and 26	55.1 55.0	62,563	9.61	6,513	2.20	137,737	M.

RESULTS OF DISCHARGE MEASUREMENTS BETWEEN MISSISSIPPI RIVER AND RED FORK LEVEES ABOVE ARKANSAS CITY, ARK.

Apr. 22	55.1	49,364	19.71	2,504	0.51	25,027	M.

For note on method, see below.

Observations and reduction made under direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary Mississippi River Commission.

GENERAL NOTES.

In the column headed "Method," M denotes meter, 2M denotes 2 meters, and F denotes double floats. When 2 meters were used they were run simultaneously and the mean of the results was tabulated. Meters were run at 6/10 depth, and the lower float at mid depth.

The observations comprise two series on the main river, one for each rise of 1913.

Observations and reductions were made under the direction of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary Mississippi River Commission.

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